

## The Character of the Beaufort Sea Ice Cover from Active and Passive Microwave Observations

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By definition, ice which survives the summer is classified as **multiyear** ice. Thus, **multiyear** ice concentration during the winter should be nearly equivalent to the ice concentration during the previous summer's minima. This condition provides a reasonable criterion for evaluation of ice concentration and ice type retrieval algorithms from remote sensing **datasets**. From **SSM/I** data, the NASA Team algorithm estimates the **multiyear**, first-year and total ice concentrations throughout the sea ice season using combinations of the polarization and spectral gradient ratios. From **ERS-1** SAR data, the remarkably stable contrast between **multiyear** ice and first-year ice provides consistent estimates of these ice concentrations. In the summer, **multiyear** ice concentration cannot be estimated from **SAR** data because free water on the surface effectively masks the **backscatter** signature of this ice type. A technique which takes advantage of the high **backscatter** of wind-roughened open water as a discrimination feature is effective for estimating the total ice concentration in the summer. With a **yearlong** (Jan 92 to Jan 93) **dataset** from the Beaufort Sea, we found that our analyses provide a very stable and consistent estimate of the **multiyear** ice concentration in the winter which is nearly equivalent to the ice concentration estimated at the end of the previous summer. We contrast this with the variability of the **MY** ice concentration and ice fraction estimates obtained using **SSM/I** data. The Team algorithm produces ice concentration and **multiyear** ice estimates which are consistently lower than those from the **SAR** data. The reasons for these discrepancies are suggested. The implication of this biases on the understanding of the Arctic Ocean ice balance and calculation of the actual ice cover are discussed.

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